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Autor: Frehner, H.-K.

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for some of the site-types. The importance of these differences for the method of mapping site-types are explained by two examples.

The regularities in the pattern of different site mosaics and the advantages of this geographical order for the separation of site-types in the field are discussed.

The silvicultural conclusions are based on the map of the site-type-groups. They are restricted to the choice of tree-species, because forest stands which could be ameliorated have no importance in the examined area. The directions for tree-species selection are derived from the natural tree-composition of the vegetation-types, the vitality of the tree species and their influence on the actual state of the habitat.

Mapping of forest vegetation in the Vth forest district of the Canton of Aargau, Switzerland, according to the method of Braun-Blanquet

By H.-K. FREHNER

The present investigation is part of a phytosociological site-mapping of some 9000 ha of forests in the north-western region of the Swiss Midlands. The forests around Moosleerau, Kirchleerau and Schöftland, which were chosen for comparing methods for site-investigation, are situated in the center of the examined area and cover slopes and plateaus between 460 to 713 m above sea level. The lower parts of the hills belong to the submontane altitudinal belt, whereas the sites above 700 metres, as well as the steeper slopes exposed to the north, are part of the lower montane belt. In most places the soils are poor in Calcium carbonate. The following nine associations, which differ in a number of differential species, were found (those marked with * are new):

Melico-Fagetum
Milio-Fagetum prov.*
Melampyro-Fagetum
Querco-Abietetum prov.*
Pulmonario-Fagetum prov.*
Carici-Fagetum
Aceri-Fraxinetum
Carici-remotae-Fraxinetum
Alno-Fraxinetum

As a basis for the description of the associations and for the site-mapping the potential natural vegetation of the sites in question was considered most useful. The composition of the tree layer in the potential natural vegetation units was estimated mainly by considering the competitional power of the various tree species. On all sites with normal drainage, and without any thick layer of raw humus, beech (*Fagus silvatica*) would prevail in the natural forest. Therefore, beech may be called the climax species of the investigated area. In the associations of the submontane belt, trees of mixed hardwood forests such as oak (*Quercus robur* and *petraea*), hornbeam (*Carpinus betulus*) and cherry (*Prunus avium*) were found as well as beech. These species are, however, distinctly inferior to beech in competition. Nevertheless, they grow well enough in the submontane belt and oak and cherry may be considered valuable species for the production of timber. Species of the beech-forest, as well as species of the mixed hardwood forest, are also found in the ground vegetation of associations of the submontane belt. Extremely acid soils with a continuous cover of raw humus are stocked with silver fir (*Abies alba*), if they are not too dry (*Querco-Abietetum*). Together with the beech forests the *Querco-Abietetum* is attributed to the *Fagion* alliance. On the other hand ash (*Fraxinus excelsior*), maple (*Acer pseudoplatanus*), and black alder forests (*Alnus glutinosa*), all of them growing on humid or wet soils, are considered to belong to the *Alno-Padion* alliance.

The floristic relationships between the different associations were expressed by a coefficient considering the number of species which two associations have in common, as well as the constancy of these species. For the submontane belt the ecological interpretation of the associations was primarily related to the water and nutrient supply (or soil-acidity) of the sites. The differences in water- and nutrient-supply can be referred mainly to parent material of the soils and to topography.

Measurements of the height of dominant and codominant trees showed that the rate of growth of spruce (*Picea abies*), fir (*Abies alba*) and beech (*Fagus silvatica*) in the research area depends largely on the water-supply and somewhat less on nutrition or soil acidity. The growth-rate of scotch pine (*Pinus silvestris*), however, was affected much less by these factors. In most associations, fir showed the greatest growth-rate of all tree-species.

Forest mapping according to the method of E. Schmid in the Suhren-Valley of the Canton of Aargau, Switzerland

By Alfred SAXER

By the method of E. SCHMID, vegetation is divided into vegetation belts by grouping species with similar area of natural distribution. These belts are subdivided into biocoenoses resp. phytocenoses, when—as in this paper—only higher forms of plant life and no animals are considered. Also mixed plant communities of more than one vegetation belt can be called phytocenoses as long as they are consolidated. This consolidation, of course, is not complete in our country, because there are relics of formerly existing belts, the flora is impoverished and human influence is remarkable.

In the examined area, the region of Moosleerau, Kirchleerau and Schöftland, Canton of Aargau, phytocenoses are characterised by species of groups which are typical of a certain belt and by various accompanying species. In tropical rain forests they would be characterized only by a certain combination of "growth forms" (life forms). These growth forms, which are hereditary, may also be used to specify phytocenoses. In addition to these growth forms, "representation forms" (individual forms, i.e. modifications caused by the site), may give important indications of the habitat, especially to the forester. The representation form of each species may be accurately judged in comparing the adult plants (in our examination they were not used because of special reasons explained in the original paper.) Site factors, such as soil, climate, human influence, may be analysed, when necessary.

In our vegetation surveys it is shown to which vegetation belt and to which growth form every taxon belongs. Tables show the symbols for the growth forms and their individual character.

The 12 phytocenoses occuring in the mapped area are described in detail, especially their floristical composition. They all belong to the *Fagus-Abies*-belt, though there is remarkable influence of the *Quercus-Tilia-Acer*-mixed deciduous forest-belt on the sites which are warm and rich in Calcium carbonate. The amount of species of the *Quercus robur-Calluna*-belt is higher on extremely acid sites on molasse. The influence of the *Picea*-belt is restricted to the highest elevations, but even there it is hardly detectable.

The percentage of species of these different belts and the growth forms give additional properties for the phytocenoses. Some "growth form spectra" are demonstrated with their growth form symbols. They enable us to compare easily the different phytocenoses.

As is usual in the method of E. SCHMID, the vegetation map shows the phytocenoses with the conventional colours of the chiefly occuring vegetation belts. A second (or third) colour is added in stripes when a second (or third) belt is strongly participating. As there are usually more than one phytocenosis in the same belt, they are indicated by letters. The uniformity of the colours on all the maps of E. SCHMID has the great advantage of giving a quick idea of the presented vegetation and how the vegetation belts are distributed in the region.

Further signs reflect the presence of some cultivated and favoured tree species. White stripes symbolize stronger human influence on forest vegetation. This enables us to distinguish immediately between "natural forest", "near-natural" and "artificial forest".